

Curriculum Vitae Carol R. Stoker

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Education: B.S. 1976, Physics (Cum Laude), University of Utah, Salt Lake City
Ph.D. 1983, Dept. of Astrogeophysics, University of Colorado, Boulder

Positions Held:

1986-Present: Staff Research Scientist, NASA Ames Research Center, Moffett Field, CA.

1985-1986: National Research Council Fellow, NASA Ames Research Center.

1984-1985: Fellow of Advanced Studies Program, National Center for Atmospheric Research.

1979-1983: Research Associate, Laboratory of Atmospheric and Space Physics, University of Colorado, Boulder.

Specializations:

- Life in extreme environments as analogs for extraterrestrial life, most recent work has focused on subsurface life.
- Developing the science rational, methodology, and technology to search for extraterrestrial life.
- Lead for numerous field experiments in extreme space analog environments involving interdisciplinary teams of engineers and scientists.
- Virtual Reality information systems for remote robot operations and data analysis.
- Analysis and modeling of multispectral imaging data to understand planetary atmospheres and surfaces.
- Meteorology, cloud structure, cloud physics and moist convection on the outer planets.
- Scientific, engineering, and operations aspects of human planetary exploration.

Relevant Experience:

- 2007- present: Principle Investigator of Ice-Ax (Innovative Partnerships Office) Manage interdisciplinary team to test an integrated payload for future drilling mission to Mars (\$250K NASA funding matched by \$1M partner contributions; 1 yr. task).
- 2003-present: Principle Investigator and project lead, MARTE project to search for subsurface biosphere in a Mars analog site and to develop/test a robotic drilling platform for Mars (\$6M, funded through NASA ASTEP program).
- 2002- present: Co-Investigator Phoenix Mars Scout Lander mission: leading Biological Potential science working group.
- 2003-2007: Principle Investigator and project lead for Mars Underground Mole, penetrometer for subsurface sampling and *in situ* composition analysis (\$3M, funded through NASA MIDP program).
- 2001 Project lead, simulation of a human mission to Mars with teleoperated rovers and remote science support from Earth in the analog Mars habitat on Devon Island, Canada.
- 2000 Science lead for K9 and FIDO two-rover field test, Black Rock Summit, NV.
- 1999 Project lead for rover mission simulation with Marsokhod rover carrying simulated Athena payload, Silver Lake, CA.
- 1997 Participating scientist on Mars Pathfinder mission, developed Virtual Reality 3-D surface visualization software used for scientific analysis and mission operations.
- 1996 Project lead for mission simulation with Marsokhod rover at Mars analog site in Tuba City, AZ.
- 1995 Project lead for Marsokhod rover Mars and Lunar mission simulation in analog site at Kilauea, HI.
- 1995 Project lead for scientific exploration of Mono Lake using a robotic submarine to study processes related to tufa formation and fossilization in an extreme (hypersaline) environment.

- 1990-1993 Project lead for two field expeditions to Antarctica using a teleoperated robotic submarine to study life in ice-covered marine environments as an analog to human exploration on the Moon and Mars.
- 1989-1991 Performed (with grad student M. Bullock) laboratory experiments and theoretical studies to understand the role played by oxidants and UV light in degradation of organic compounds on Mars.
- 1986-1988 Team member Voyager imaging team, studying vertical structure of clouds and aerosol hazes on Uranus and Neptune, modeling moist convection on these planets.
- 1985-1986 National Research Council postdoctoral fellow at NASA Ames Research Center, Studies of moist convection and vertical structure of clouds on Uranus, and rain on Neptune.
- 1984-1985 Postdoctoral fellow at National Center for Atmospheric Research, studies of cumulous liquid water clouds on Jupiter and potential for microbial growth in this habitat.
- 1976-1983 Ph. D Thesis project, “Vertical structure and convective dynamics of the Equatorial Plume clouds on Jupiter”.
- 1981-1987 Organized the Case for Mars conferences on Human Mars Exploration.
- 1980 Collaborated with biologist P. Boston on experiments to show that heterotrophic bacteria could utilize tholin as a sole carbon source, relevant to origin of life on Earth and current life on Titan.
- 1977-1978 Graduate Research Assistant. Performed experiments to measure radio emissions produced by the fracture of quartz-bearing rocks.

Honors and Awards:

- 2009 NASA Group Achievement award to Phoenix Project Science Development Team
2008 NASA Outstanding Leadership Medal
2006 NASA Group Achievement award for MARTE project
2001 NASA Group Achievement award for K9 and FIDO rover field trials (jointly awarded by NASA Ames and JPL)
1998 Laurel Award from Aviation Week for Virtual Reality on Mars Pathfinder
1998 NASA Group Achievement Award for Mars Pathfinder support team
1995 NASA Group Achievement Award for Antarctic Telepresence Project
1994 NASA Ames Honor Award for Telepresence Project
1992 Antarctic Service Medal for special service in Antarctic exploration
1992 Vice chair, Red team review of NASA Moon-Mars human exploration initiative
1991 NASA Group Achievement Award for contributions to the “90 Day Study” on human exploration of the moon and Mars
1990 NASA Group Achievement Award to the Voyager Imaging Science Investigation during the encounter with Neptune
1985 First recipient of the Thomas Paine Mars Flag award for the most outstanding contribution leading to humans on Mars, presented by former NASA administrator Dr. Thomas O. Paine

Publications: Journals And Books

- Stoker, C.R., A. Zent, D. Catling, S. Douglas, J. Marshall, P. D. Archer Jr., B. Clark, S. Kounaves, M. Lemmon, R. Quinn, N. Renno, P. Smith and S. Young, The habitability of the Phoenix landing site, *J. Geophys. Res.* in press for special issue on Phoenix Mission results, 2009je003421.
Renno, N. and 24 others (2009) Independent physical and thermodynamical evidence of liquid water on Mars, *J. Geophys. Res.* J. Geophys. Res., 114, , doi:10.1029/2009JE003362.
Smith, P.H., L.K. Tamppari, R.E. Arvidson, D. Bass, D. Blaney, W.V. Boynton, A. Carswell, D.C. Catling, B.C. Clark, T. Duck, E. DeJong, D. Fisher, W. Goetz, H.P. Gunnlaugsson, M.H. Hecht, V. Hipkin, J. Hoffman, S.F. Hviid, H.U. Keller, S.P. Kounaves, C.F. Lange, M.T. Lemmon, M.B. Madsen, M. Malin, W.J. Markiewicz, J. Marshall, C.P. McKay, M.T. Mellon, D.W. Ming, R.V. Morris, N. Renno, W.T. Pike, U. Stauffer, C. Stoker, P. Taylor, J. Whiteway, A.P. Zent. H₂O at the Phoenix landing site, *Science*, 325, 58-61, 2009.

- K. Zacny, Y. Bar-Cohen, K. Davis, P. Coste, G. Paulsen, S. Sherrit, J. George, B. Derkowsky, S. Gorevan, D. Boucher, J. Guerrero, T. Kubota, B. J. Thomson, S. Stanley, P. Thomas, N. Lan, C. McKay, T. C. Onstot, C. Stoker, B. Glass, S. Wakabayashi, L. Whyte, G. Visentin, E. Re, L. Richter, M. Badescu, X. Bao, R. Fincher, T. Hoshino, P. Magnani, and C. Menon (2009) "Extraterrestrial Drilling and Excavation," Chapter 6 in Y. Bar-Cohen and K. Zacny (Eds.), "Drilling in Extreme Environments - Penetration and Sampling on Earth and Other Planets," Wiley – VCH, Hoboken, NJ, ISBN-10: 3527408525, ISBN-13: 9783527408528.
- Davila, A.F., A.G. Fairén, L. Gago, **C. Stoker**, R. Amils, R. Bonaccorsi, J. Zavaleta, D. Lim, D. Schultze-Makuch, C. McKay. Subsurface formation of oxidants on Mars and implications for the preservation of organic biosignatures. *EPSL* 272, pp. 456-463. doi: 10.1016/j.epsl.2008.05.015., 2008.
- Zacny, K. Y. Bar-Cohen, M. Brennan, G. Briggs, G. Cooper, K. Davis, B. Dolgin, D. Glaser, B. Glass, S. Gorevan, J. Guerrero, C. McKay, G. Paulsen, S. Stanley and **C. Stoker**, Drilling systems for extraterrestrial subsurface exploration, *Astrobiology* 8,3, 2008. DOI:10.1089/ast.2007.0179
- Stoker, C.R., H. N. Cannon, S. E. Dunagan, L. G. Lemke, B. J. Glass, D. Miller, J. Gomez-Elvira, K. Davis, J. Zavaleta, A. Winterholler, M. Roman, J. A. Rodriguez-Manfredi, R. Bonaccorsi, M. S. Bell, A. Brown, M. Battler, B. Chen, G. Cooper, M. Davidson, D. Fernández-Remolar, E. Gonzales-Pastor, J.L. Heldmann, J. Martínez-Frías, V. Parro, O.Prieto-Ballesteros, B. Sutter, A. C. Schuerger, J. Schutt, and Fernando Rull, The 2005 MARTE robotic drilling experiment in Rio Tinto, Spain: Objectives, approach, and results of a simulated mission to search for life in the Martian subsurface. *Astrobiology*, 8, 5, 2008, DOI:10.1089/ast.2007.0217.
- Fernández-Remolar , D., O. Prieto-Ballesteros, N. Rodríguez, F. Gómez, R. Amils, J. Gómez-Elvira, T. Stevens, and **C. Stoker**, Underground habitats found in the Río Tinto Basin: an approach to Mars subsurface life exploration, *Astrobiology*, Vol. 8 No. 5 DOI:10.1089/ast.2007.0217, 2008.
- Bonaccorsi, R. and **C. Stoker**, Ground truth of drilling results from core logging and returned samples and comparison with the remote science results, *Astrobiology*, Vol. 8 No. 5 DOI:10.1089/ast.2007.0217, 2008.
- Parro, V., P. Fernández-Calvo, J. A. Rodríguez Manfredi, M. Moreno-Paz, L. A. Rivas, M. García-Villadangos, R. Bonaccorsi, J. E. González-Pastor, O. Prieto-Ballesteros, A. C. Schuerger, M. Davidson, J. Gómez-Elvira, and **C. Stoker**, SOLID2: An antibody array-based life detector instrument in a Mars Drilling Simulation Experiment (MARTE). *Astrobiology*, Vol. 8 No. 5 DOI:10.1089/ast.2007.0217, 2008.
- Sutter, B., A. Brown, and **C. Stoker**, Mineralogy of Rio Tinto Cores based on remote sensing measurements and comparison with ground truth, *Astrobiology*, Vol. 8 No. 5 DOI:10.1089/ast.2007.0217, 2008.
- Prieto-Ballesteros, O., J. Martínez-Frías, J. Schutt, B. Sutter, J. Heldmann, M.S. Bell, M. Battler, H. Cannon, Javier Gomez-Elvira, and **C. Stoker**, On The Subsurface Geology Of A Drilling Simulation Experiment Of A Mission To Mars In Rio Tinto Region (M.A.R.T.E. Project). *Astrobiology*, Vol. 8 No. 5 DOI:10.1089/ast.2007.0217, 2008.
- Stoker, C. and K. Rages, The True Color of Yogi: Modeling to Understand Color Variations of Rocks at the Mars Pathfinder Landing Site, *Icarus*, in revision, 2008.
- Cannon, H., **C. R. Stoker**, S. Dunagan, K. Davis, J. Gomez-Elvira, B. Glass, L. Lemke, D. Miller, R. Bonaccorsi, M. Branson, S. Christa, J. A. Manfredi-Rodriguez, E. Mumm, G. Paulsen, M. Roman, M. Winterholler, J. Zavaleta, MARTE: Technology development and lessons learned from a Mars drilling mission simulation. *Journal of Field Robotics*, 24, 10, Pages 877-905, 2007.
- B. Glass, and **C. Stoker**, Advances in space drilling technologies, *The Way Ahead, Society of Petroleum Engineers Pubs.*, Vol. 3, No. 2, 21-23, 2007.

- Stoker, C.R., A. Gonzales, and J.R. Zavaleta, The Mars and Moon Underground Mole, Proceedings of NASA Technology and Science Conference, Baltimore, MD. June 2007.
- Seif, A., **C.R. Stoker**, R.E. Young, J. D. Mihalov, C.P. McKay, and R. Lorenz, Determination of physical properties of a planetary surface by measuring the deceleration of a probe upon impact: application to Titan, *Planetary and Space Science*, 53, 594-600, 2005.
- Stoker, C.R., T. Roush, R. Arvisdon, J. Bresina *et al.* Two dogs, new tricks: field trials with FIDO and K9 rovers at Blackrock summit, Nevada, May 2000, *J.Geophys. Res.* 107, E11, 8009, 2002.
- Stoker, C.R., N. Cabrol, T. Roush, J. Moersch *et al.* The 1999 Marsokhod rover mission simulation at Silver Lake California: Mission overview, data sets, and summary of results *J. Geophys. Res.* 106, 7639-7663, 2001.
- Cabrol, N., G. Chong-Diaz, **C. Stoker** *et al.* Nomad rover field experiment, Atacama Desert, Chile, 1. Science results overview, *J. Geophys. Res.*, 106, 7785-7806, 2001.
- Johnson, J., S. Ruff, J. Moersch, T. Roush, K. Horton, J. Bishop, N. Cabrol, C. Cockell, P. Gazis, H. Newsom, and **C. Stoker**, *J. Geophys. Res.*, 106, 7683-7712, 2001.
- Stoker, C.R., E. Zbinden, T. T. Blackmon, B. Kanefsky *et al.* Analyzing pathfinder data using virtual reality and super-resolved imaging, *J. Geophys. Res.*, 104, 8889-8906, 1999.
- Golombek, M.P., R.C. Andersen, J.R. Barnes *et al.*, Overview of the Mars Pathfinder mission: Launch through landing, surface operations, data sets, and science results, *J. Geophys. Res.*, 104, 8523-8554, 1999.
- Stoker, C., The search for life on Mars, the role of rovers, *J. Geophys. Res.*, 103, 28557-28575, 1998.
- Smith, P.E. *et al.* , Results from the Mars Pathfinder Camera, *Science*, 278, 1758-1765, 1997.
- Stoker, C. and M. Bullock, Organic degradation under simulated Martian conditions, *J. Geophys. Res.*, 102, 10881-10888, 1997.
- Stoker, C. and C. Emmart (eds.) Strategies for Mars: A Guide to Human Exploration, *AAS Sci. Tech. Ser.*, 86, 619 pg., 1996.
- Stoker, C.R. Scientists on Mars: Science Strategy for Human Exploration, in Strategies for Mars: A Guide to Human Exploration, C. Stoker and C. Emmart , eds. *AAS Sci. Tech. Ser.*, 86, 537-560, 1996.
- Stoker, C.R., D.R. Barch, B.P. Hine III, and J. Barry, Undersea exploration in Antarctica using a robotic submarine with telepresence user interface, *IEEE Expert*, 10, 14-24, 1995.
- Moore, J., D. Janke, G. Clow, W. Davis, V. Gulick, C. McKay, **C. Stoker** and A. Zent , The Circum-Chryse region as a possible example of a hydrologic cycle on Mars: geologic evidence and theoretical evaluation, *J. Geophys. Res.* 100, 5433-5447, 1995.
- Bullock, M.A., **C.R. Stoker**, C.P. McKay and A. Zent , A coupled soil-atmosphere model of H_2O_2 on Mars, *Icarus* 107, 142-154, 1994.
- Stoker, C.R., J.L. Gooding, T. Roush, A. Banin, B. Clark, D. Burt, G. Flynn and O. Gwynn , The physical and chemical properties and resource potential of Martian surface soils, in Resources of Near Earth Space, J. Lewis (ed.), University of Arizona Press, 659-708, 1993.
- McKay, C.P., R.L. Mancinelli, C.R. Stoker, and R.A. Wharton, The possibility of life on Mars during a water-rich past, in Mars, H.H Kieffer, B.M. Jakosky, C.W. Snyder and M.S. Matthews, (eds), University of Arizona Press, 1234-1245, 1992.
- McKay, C.P., and C.R. Stoker, Gaia and life on Mars, in Scientists on Gaia, Stephen H. Schneider and Penelope Boston, (eds.), MIT press, 375-382, 1991.
- Stoker, C.R., C.P. McKay, R.M. Haberle, and D.T. Andersen, Science strategy for human exploration of Mars, *Advances in Space Research*, 12, 479-490, 1990.
- Sun, Z., C.R. Stoker and G. Schubert, Thermal and humidity winds in outer planet atmospheres, *Icarus* 91, 154-160, 1991.
- Rizk, B., W.K. Wells, D.M. Hunten, C.R. Stoker, R.S. Freedman, T. Roush, J.B. Pollack, and R.M. Haberle, Meridional Martian water abundance profiles during the 1988-1989 season, *Icarus* 90, 205-213. 1991.

- Pollack, J.B., T. Roush, F. Witteborn, J. Bregman, D. Wooden, C. Stoker and O. Toon, Thermal emission spectra of Mars (5.4-10.5 μm): evidence for sulfates, carbonates, and hydrates, *J. Geophys. Res.*, 95, 14595-14627, 1990.
- Stoker, C.R., P.J. Boston, R. Mancinelli, W. Segal, B. Khare, and C. Sagan, Microbial metabolism of spark tholin, *Icarus*, 85, 241-256, 1990.
- Smith *et al.*, Voyager 2 at Neptune: Imaging Science Results, *Science*, 246, 1422-1449, 1990.
- Stoker, C.R. and O.B. Toon, Moist convection on Neptune, *Geo. Res. Lett.*, 16, 8, 929-932, 1989.
- Stoker, C.R., The Case for Mars III, C. Stoker(Ed.), *American Astronomical Society, Science and Technology Series*, Vols., 74-75, 1989.
- McKay, C.P. and **C.R. Stoker**, The early environment of Mars: Implications for life, *Rev. Geophys.* 27, 189-214, 1989.
- Stoker, C.R. Moist convection: a mechanism for producing the vertical structure of the Jovian Equatorial Plumes, *Icarus*, 66, 106-125, 1986.
- McKay, C.P., **C.R. Stoker**, J. Morris, G. Conley, and D. Schwartz , Space Station Gas-Grain Simulation Facility: Application to Exobiology, *Adv. Space Res.* 12, 195-206, 1986.
- Smith, B.A., Soderblom, R.A., Beebe *et al.*, Voyager 2 in the Uranian System: Imaging Science Results, *Science* , 233, 43-64. 1986.
- Stoker, C.R., and C.W. Hord, Vertical cloud structure of Jupiter's Equatorial Plumes, *Icarus*, 64, 557-575, 1985.
- Stoker, C.R. Vertical Structure and Convective Dynamics of the Equatorial Region on Jupiter, Ph. D. dissertation, University of Colorado, Boulder, 1983.
- Warwick, J.W., **C.R. Stoker**, T.R. Meyer, Electromagnetic emission associated with earthquakes: application to the great Chilean earthquake of May 16, 1960, *J. Geophys. Res.*, 87, 2851-2859, 1982.

Recent Conference Publications:

Stoker C.R., J. Zavaleta, M. Bell, S. Direto, B. Foing, D. Blake, and S. Kim, Drilling On The Moon And Mars: Developing the Science Approach for Subsurface Exploration with Human Crews, 41st Lunar and Planetary Science Conference, Abstract 2697, 2010.

A. Borst, S. Peters, B. H. Foing, **C. Stoker**, L. Wendt, C. Gross, J. Zavaleta, P. Sarrazin, D. Blake, P. Ehrenfreund, L. Boche-Sauvan, J. Page, C. McKay, P. Batenburg, G. Drijkoningen, E. Slob, P. Poulakis, G. Visentin, A. Noroozi, E. Gill, M. Guglielmi, M. Freire, R. Walker, M. Sabbatini, V. Pletser, E. Monaghan, R. Ernst, J. Oosthoek, P. Mahapatra, D. Wills, C. Thiel, J. P. Lebreton, T. Zegers, A. Chicarro, D. Koschny, J. Vago, H. Svedhem, G. Davies, A. Westenberg, J. Edwards, ExoGeoLab Team, EuroGeoMars Team, Geochemical Results from EuroGeoMars MDRS Utah 2009 Campaign,, 41st Lunar and Planetary Science Conference, Abstract #2744, 2010.

J. Hendrikse, B. H. Foing, E. Monaghan, **C. Stoker**, J. Zavaleta, F. Selch, P. Ehrenfreund, L. Wendt, C. Gross, C. Thiel, S. Peters, A. Borst, P. Sarrazin, D. Blake, L. Boche-Sauvan, J. Page, V. Pletser, P. Mahapatra, D. Wills, C. McKay, G. Davies, W. van Westrenen, P. Batenburg, G. Drijkoningen, E. Slob, P. Poulakis, G. Visentin, A. Noroozi, E. Gill, M. Guglielmi, M. Freire, R. Walker, ExoGeoLab Team, EuroGeoMars Team, Highlights from Remote Controlled Rover for EuroGeoMars MDRS Campaign, 41st Lunar and Planetary Science Conference, Abstract #2435, 2010.

L. Boche-Sauvan, B. H. Foing, **C. Stoker**, P. Ehrenfreund, L. Wendt, C. Gross, C. Thiel, S. Peters, A. Borst, J. Zavaleta, P. Sarrazin, D. Blake, J. Page, V. Pletser, E. Monaghan, P. Mahapatra, A. Noroozi, P. Giannopoulos, A. Calzada, R. Walker, T. Zegers, ExoGeoLab, ILEWG ExoHab Team, EuroGeoMars Team, ILEWG ExoHab & EuroGeoMars Campaigns: Habitability & Human Operations, 41st Lunar and Planetary Science Conference, Abstract

#1759, 2010.

- P. Ehrenfreund, B. H. Foing, **C. Stoker**, J. Zavaleta, R. Quinn, D. Blake, Z. Martins, M. Sephton, L. Becker, G. Orzechowska, C. van Sluis, L. Boche-Sauvan, C. Gross, C. Thiel, L. Wendt, P. Sarrazin, P. Mahapatra, S. Direito, W. Roling, EuroGeoMars MDRS Team, EuroGeoMars Field Campaign: Sample Analysis of Organic Matter and Minerals, 41st Lunar and Planetary Science Conference, Abstract #1723, 2010.
- Stoker, C.R., P.D. Archer, Jr., D. Catling, B. Clark, J. Marshall, P. Smith, S. Young. The habitability of the Phoenix landing site: a comparative assessment. 40th Lunar and Planetary Science Conference, Abstract 2082, 2009.
- Young, S.S., C. R. Stoker and M.H. Hecht, Polar Mars biohabitability assessment of the Wet Chemistry Analysis on the 2007 Phoenix Mars Scout mission, 40th Lunar and Planetary Science Conference, Abstract 1178, 2009.
- Blaney D. L. D. Archer D., R. Arvidson, S. Cull, M. Ellehoj, D. Fisher, M. Hecht, M. Lemmon, M. Mellon, R. Morris, T. Pike, P. Smith, and C. Stoker, Multi-Spectral Imaging of the Phoenix Landing Site: Characteristics of Surface and Subsurface Ice, 40th Lunar and Planetary Science Conference, Abstract 2047, 2009.
- Bramall, N., C. Stoker, B. Price and L. Alamandola, Detecting organics in situ using fluorescence, 40th LPSC, abstract 2470, 2009.
- Stoker, C. R. et al. Possible Segregated Ice at the Phoenix Landing Site: Was Liquid Water Involved? AGU Fall meeting, San Francisco, CA., December 2008.
- Stoker, C.R. The Scientific Rationale and Technical Challenges of Drilling on the Moon and Mars. Presented at International Lunar Exploration Working Group/Space Resources Roundtable joint conference, Cape Canaveral, Florida. Oct. 2008.
- Stoker, C.R. Searching for Life in the Martian subsurface: results from the MARTE Astrobiological drilling experiment and implications for future missions, 7th International Conference on Mars, Pasadena, CA July 2007.
- McKay, C.P., C. Stoker, and M. Hecht, Astrobiology on Mars: Where to go? What to do?: Subsurface sampling in the polar regions for evidence of past life, 7th International Conference on Mars, Pasadena, CA July 2007.
- Stoker, C.R. The scientific rationale and technical approach for drilling on the Moon and Mars, Workshop of Science Associated with Lunar Exploration Architecture, Tempe AZ, March, 2007.
- Stoker, C.R. The goals and approach of the Phoenix mission for evaluating the habitability of the northern plains on Mars, 4th International Conference of Mars Polar Science and Exploration, Davos Switzerland, Oct. 2-6, 2006.
- Stoker, C.R. Field simulation in analog environments to support human exploration of the Moon and Mars, 8th International Lunar Exploration Working Group Meeting, Beijing, China, July, 2006.
- Stoker, C.R., L.G.Lemke, H. Cannon, B. Glass, S. Dunagan, J. Zavaleta, D. Miller, H. Gomez-Elvira (2006), The search for subsurface life on Mars: Results from the MARTE analog drilling experiment in Rio Tinto, Spain, 37th LPSC, Abstract 1537, Houston, TX, March 2006.
- Stoker, C., L. G. Lemke, and A. A. Gonzales (2006), Applications of burrowing moles for planetary and lunar subsurface access, 37th LPSC, Abstract 5742, Houston, TX, March 2006.
- Stoker, C.R., L.G. Lemke, H. Cannon, B. Glass, S. Dunagan, J. Zavaleta, and H. Gomez-Elvira (2005), Field Simulation of a drilling mission to Mars to search for subsurface life, 36th LPSC, Houston, TX, March 2005.
- Fernandez-Remolar, D.C., O. Prieto-Ballesteros, N. Rodríguez, F. Dávila, T. Stevens, R. Amils, J. Gómez-Elvira and **C. Stoker**, Rio Tinto faulted volcanosedimentary deposits as analog habitats for extant subsurface biospheres on Mars: a synthesis of the MARTE drilling project geobiology results. 36th LPSC, 1766, Houston, TX, March 2005.

- Battler, M. and **C. Stoker**, Searching for life underground: an analysis of remote sensing observations of a drill core from Rio Tinto, Spain for mineralogical indications of biological activity. 36th LPSC, Houston, TX, March 2005.
- Glass, B.J., H. Cannon, C. Stoker, and K. Davis, Robotic and human tended drilling automation for subsurface exploration, *International Astronautical Congress*, IAC-05-A5.2.01, 2005.
- Stoker, C.R., T. Stevens, R. Amils, J. Gomez-Elvira, N. Rodriguez, F. Gomez, E. Gonzales-Toril, A. Aguilera, D. Fernandez-Remolar, S. Dunagan, L.G. Lemke, J. Zavaleta, and J.L. Sanz , Characterization of a subsurface biosphere in a massive sulfide deposit at Rio Tinto, Spain: implications for extant life on Mars. 36th LPSC, Abstract 1534, Houston, TX, March 2005.
- Stoker, C.R. L.G. Lemke *et al.*, Mars Analog Río Tinto Experiment (MARTE): 2003 Drilling Campaign To Search For A subsurface Biosphere At Río Tinto, Spain. 35th LPSC, Abstract 2025, Houston, TX, March 2004.
- Fernández-Remolar, D.C. et al., Searching For An Acidic Aquifer In The Río Tinto Basin. First Geobiology Results of MARTE Project. 35th LPSC, Abstract 1766, Houston, TX, March 2004.
- Stoker, C.R. *et al.* Mars Analog Río Tinto Experiment (MARTE): 2003 Drilling Campaign To Search For A Subsurface Biosphere At Río Tinto, Spain. Astrobiology Science Conference, March 28-April 1, 2004, Moffett Field, CA, 2004.
- Fernández-Remolar, D.C., *et al.* Iron oxides inside metallic ores of the Rio Tinto Mars analog as possible traces of chemolithotrophic cryptobiospheres. First geobiology results of MARTE project. 2004 Astrobiology Science Conference, March 28-April 1, 2004, Moffett Field, CA, 2004.
- Stoker, C.R., L. Richter, W.H. Smith (2004), Subsurface Sampling and Sensing using Burrowing Moles, Mars Astrobiology Science and Technology Workshop, Sept. 8-10, 2004, Washington D.C.
- Stoker, C. A Search for life in the subsurface at Rio Tinto Spain, an analog to searching for life on Mars. American Geophys. Union, San Francisco, December 2003.
- Stoker, C. and K. Rages, The True Color Of Yogi: An accurate method for removing diffuse illumination from multispectral images of Mars, 33rd LPSC, Houston, TX, March 2002.
- Stoker, C. and K. Rages, Get the red out: removing diffuse sky illumination from Mars Pathfinder images, 32nd LPSC, Houston, TX, March 2001.
- Stoker, C. and E. Zbinden, Virtual reality on Mars Pathfinder and Mars Polar Lander, RTO SCI symposium on Advanced Mission Management for Improved Tactical Operations, Florence Italy, Sept. 1999, published in MP-46, 2000.
- Blackmon, T., E. Zbinden, C. Stoker, and M. Sims, Virtual Reality for Mars Pathfinder, *IEEE Transactions, Special Issue on Virtual Reality in Robotics and Automation*, 1998.
- Stoker, C. and B. Hine, Telepresence control of mobile robots: Kilauea Marsokhod experiment AIAA paper 96-0338, Reno NV Jan. 1996.
- Stoker, C. R., D. Barch, J. Farmer, M. Flagg, T. Healy, T. Tengdin, H. Thomas, K. Schwer and D. Stakes, Exploration Of Mono Lake With An ROV: a prototype experiment for the MAPS AUV program , *IEEE Symposium on Autonomous Underwater Vehicle Technology*, Monterrey, CA, June 3-6, 1996.
- Stoker, C., G. Briggs, J. Farmer, J. Moore, A. Zent, and R. Greeley, Imaging support of surface rover operations: recommendations to the Mars Surveyor Program, NASA Internal Report, Jan. 1996.
- Stoker, C. From Antarctica to Space: Use of telepresence and virtual reality in control of a remote underwater vehicle, *Proceedings of Space Simulation Conference*, Baltimore MD, Oct. 1994.
- Greeley, R., A.T. Basilevsky, R.O. Kuzmin, C. Stoker and G. Taylor, Science results from the Marsokhod tests, Amboy lava field, California, 1994, Proceedings of International Planetary Rover Symposium, Russia, 1994.
- Stoker, C., J. Barry, D. Barch and B. Hine, Use of Telepresence and Virtual Reality in Undersea Exploration: 1993 Antarctic Telepresence Experiment, Proc. AAAI workshop AI Technologies in Environmental Applications, Seattle WA, July, 1994.

- Hine, B., C. Stoker *et al.* The Application of Telepresence and Virtual Reality to Subsea Exploration, Proc. ROV '94, *The 2nd Workshop on: Mobile Robots for Subsea Environments*, Monterrey CA, May, 1994. International Advanced Robotics Program (IARP) , M.J. Lee and R. B. McGee (Eds), pp 117-126.
- Stoker, C.R. Telepresence in human exploration of Mars: field studies in analog environments, *Proceedings of Vision 21: Interdisciplinary Science and Engineering in the era of Cyberspace*, Cleveland OH, March , 1993, NASA Conference Publication 10129, pp 23-34, 1993.
- Gwynne, O., C. Stoker, D. Barch, L. Richardson and P. Ballou, Telepresence control of ROV's Application to undersea and future space exploration, in *Intervention/ ROV 92*, San Diego CA, June 10-12, 1992.
- Gwynne, O. and C.R. Stoker, Telepresence for the exploration of hostile and remote environments: from sea to space, *Proceedings of IDEAA 1, International Conference on Design for Extreme Environments*, Houston, TX, Nov. 5-10, 1991.
- McGreevy, M. and C.R. Stoker, Telepresence for Planetary Exploration, *Proceedings of the Society of Photo-optical Engineering conference Space in the 21st century*, Boston, MA , Nov. 6-7, 1990, *Soc.Photo-optical Eng.* 1387, 110-123, 1990.
- Stoker, C.R. L.G. Lemke and C.P. McKay, The Case for human exploration of Mars, *Proceedings of the AIAA Symposium on Space in the 21st century*, Huntsville AL, Sept 25-27, 1990.
- Lemke, L.G., C.R. Stoker, O. Gwynne and C.P. McKay, Mission Strategy for human exploration of Mars: summary of workshops held at the Case for Mars IV conference, Boulder CO, 4-8 June, 1990.
- Stoker, C.R., C.P. McKay, R.M. Haberle and D.T. Andersen, Mars human exploration science strategy, Report of the Ames Mars Study Project & Mars Science Workshop at NASA Ames Research Center, 30-31 Aug. 1989.
- Stoker, C.R. (Editor), The Case for Mars III, American Astronomical Society, Science and Technology Series, Vols. 74-75, 1989.
- Stoker, C.R., S.M. Welch, P.J. Boston, J. French, T.R. Meyer, C.P. McKay, R.L. Staehle, R.B. Wilson, and R.L. Grossman, Concept Development for a Mars Research Station, *J.P.L. Tech. Rep. No. 86-28*, 1986.
- Stoker, C., J. Moore, R. Grossman, and P. Boston, Scientific program for a Mars base: results of the Science workshop at the Case for Mars II, Proceedings of the Case for Mars II, C.P. McKay, ed. *AAS Sci. Tech. Ser.* 62, 255-282, 1985.
- McKay, C. P., and C. Stoker Why Mars?, in Proceedings of the Case for Mars I, P.J. Boston, ed., *AAS Sci. Tech. Ser.* 57, 19-29, 1984.
- Stoker, C.R. and C.P. Mission to Mars, the case for a settlement, *Technology Review*, 27-37, November/December, 1983.
- Boston, P.J. and C.R. Stoker, Microbial metabolism of organic molecules produced by chemical synthesis in a reducing atmosphere: implications for the origin of life, Proc. of L.P.I. conference on Planetary Volatiles, *L.P.I. Tech. Rep. 83-01*, 31-39, 1983.